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WINTER INJURY TO FRUIT CROPS

MAINE: The killing of roots and tops of apple trees in Maine has been serious three times during the last 35 years. The winters of 1906-07, 1917-18, and 1933-34 stand out because of the relatively high mortality of apple trees, particularly of the Baldwin variety. Of these three periods the last has been by far the most destructive.

According to the official records here at Orono in the winter of 1933-34 we had 43 days when the temperature fell below zero from December 12 to February 28, inclusive. On December 28, 29, and 30 the official temperatures were -23°, -24°, and -31°. On February 6, 7, 8, and 9 the official temperatures were -23°, -25°, -23°, and -27°. On three other days the temperature ranged from -20° to -27°. These are official records and are naturally more conservative than those recorded by private thermometers, especially those located where lower temperatures are likely. Unofficial temperatures of from -50° to -65° have been reported from some parts of the orchard area. (Taken from Spray Service of the Maine Agricultural Extension Service Vol. 8. No. 2. April 1934. By - A. K. Gardner).

Cumberland County - April 11, 1934. 25 to 85 per cent on Baldwins ranging in age from 14 to 60 years. Injury confined to trees that bore heavily last year or trees in poor physical condition. Discoloration of limb tissue ranging from slight brown to black. None to 50 per cent reported on Greenings; 25 to 50 per cent reported on Starks. No injury seen or reported as yet on McIntosh, Cortland, Wealthy, Red and Golden Delicious. (D. Folsom).

MASSACHUSETTS: Although the past winter was a severe one, the official weather records at Amherst indicate that it was not as severe as the winter of '17 and '18. The temperature dropped to -22° F. only once, on February 9, while during the winter of '17 and '18 it dropped to -22.5° F. twice, on December 30 and February 2. Also during the winter of '17 and '18 there were twenty-six days when the temperature was zero or below, on twelve of which -10° F. or lower was registered. During the past winter there were only twenty-three days with a temperature of zero or below and on only seven of them did the thermometer register -10° F. or below.

As a result of the low temperature all except the hardiest varieties of apples have suffered some injury. This varies from a slight browning in and around the pith of the spurs to considerable browning of the wood and bark. Baldwins appear to have suffered the most. A few cases of very severe injury to the trees have been reported. Kings were observed with severe browning in and around the pith of the spurs. Rhode Island Greenings, Gravensteins, Red Astrachan and several other varieties have suffered light to moderate injury to the spur. Such hardy varieties as Wealthy, Duchess, and McIntosh appear to have suffered little, if any, damage.

Peach fruit buds have been practically all killed and the trees, particularly those low in vigor, have been damaged considerably in some sections.

Most varieties of pears have suffered light to moderate injury in and around the pith of the spurs. Some trees show browning of the wood and bark.

No injury has been observed on plums except the Japanese varieties. About 40 to 50 per cent of the buds have been killed. Sour cherry buds have been injured but probably not enough to materially reduce the crop. Some sweet cherries have been observed to be injured severely in the crotches and trunk.

Tip killing of grape canes is not serious. In most cases more than the injured portions would be removed in the usual pruning operations. Raspberries have been very severely injured. In many sections they have been killed to the snow line. Due to plenty of snow strawberries have been injured little, if any. (J. S. Bailey, Mass. State Coll., Apr. 6).

NEW YORK: (Reports from State College of Agriculture Weekly News Letter, April 9 and April 16).

Orange County. Concerning winter injury, three rows of eighteen year old McIntosh trees in an orchard that had a good crop last year and has been rather heavily pruned but kept cultivated, have the bark loosened practically all the way around the trunks from the heads down to the crowns and even down on the main roots. Baldwins in this same orchard show discoloration of the bark, crotch injury, and trunk injury on the northwest side. Some Greening trees show more or less bark injury in a band from three to eight inches wide just above the surface of the ground. Winter Banana shows slight injury on a few trees and a few peach trees show severe injury on the trunk and less on the small branches. The fruit spurs in this planting (apples) showed little injury. In other orchards, however, there was more spur discoloration and little trunk and crown injury. The other varieties showing the most injury are Jonathan, Sutton, and Newton. (Ray Bender - Apr. 16).

Suffolk County. Peaches show practically no wood injury, but bud injury runs from 40 per cent to 100 per cent along Sound Shore. Out of some 3,000 buds in a 5,000 tree orchard, 59 per cent of buds were injured. Peaches in middle part of Island show 75 to 100 per cent injury, while South Shore is 100 per cent done for. (A. G. West, Apr. 16).

Dutchess County. Winter injury to apple wood is most severe on Baldwin, Opalescent, Spitzenburg, King, Cravenstein, Jonathan, and R. I. Greening. Some injury to twigs and spurs even on McIntosh showing no wood injury in larger limbs and trunks. Peach fruit buds seem all gone with severe wood damage in all woody parts in many orchards. Some sweet cherry fruit buds alive but wood injury looks pretty bad even on trees with quite a few live buds. The same is true of sour cherries but more fruit buds alive and less wood injury. Pear buds show a lot of injury but the chief concern is over spurs and small woody parts which seem "hard hit" in most varieties. Grapes look O. K. (J. A. Evans, Apr. 9).

Ulster County. Winter injury is very serious with most kinds of fruits. Peaches have been hurt the worst. Many of the older orchards are now being pulled. There are instances where 6 to 8 year old orchards are 50 per cent or more killed. I have found the worst injury occurring down below the ground at the union of the stock with the cion. The fruiting buds are 100 per cent killed. Of the apples, Baldwin, R. I. Greening, Jonathan, King, and Hubbardson are injured the worst. McIntosh, Cortland, Delicious, and Spy appear to be the least injured. The injury is very spotted even in any one orchard. Pears are badly hurt, with Bosc heading the list, and Seckel the least. Some Bosc trees appear to be dead at this time, while others have a lesser degree of apparent freezing. In the case of grapes - Delaware and Niagara show the greatest amount of injury. Raspberries, for some unknown reason appear to have wintered in fine shape. Well developed and strong canes, may be green right up to the last bud. (Apr. 9).

Grapes, even Concords, did not withstand the freezing temperatures any too well. Some growers are reporting 50 to 90 per cent killing of the buds. I have counted as high as 30 per cent killing in a few vineyards. Found 45 per cent of the Delicious buds frozen in an orchard at Marlboro. Dead Jonathan buds are quite plentiful. Although there are some sweet cherry buds alive there is a discoloration at the base of the buds which does not look any too good at this time. (Wm. J. Clark, Apr. 16).

Clinton County. All kinds of fruit have suffered more or less from winter injury but no estimate of the damage can yet be made. In McIntosh apples in the Peru area, the injury seems largely restricted to the wood in spurs, terminals and small branches. (A. B. Burrell, Apr. 9).

NEW JERSEY: Professor M. A. Blake of the Horticultural Department reports that the degree or the severity of the injuries to peach trees as a result of low temperatures during February varies greatly according to the orchard and the age and variety of the trees. Bud killing is general and almost complete throughout the State. Injury to the wood of the twigs of the previous season's growth varies from very slight to a distinct browning and killing. In the latter case, the twigs will begin to dry out and die back as the days become warmer and the humidity lower. Weak trees are especially likely to show a marked brown discoloration of the wood even of the two and three year old branches when exposed to temperatures of -15° F. or lower.

In many orchards, however, the wood of secondary branches from three to six feet above the soil still remains a nearly normal color.

A form of injury now noticeable in some orchards is the distinct yellowing of the inner bark upon the main branches and trunk. This has not occurred to any extent in New Jersey since 1907 and 1908 when it was quite general in the northern counties.

The splitting or separation of the bark from the trunk and main branches of peach trees does not appear to be at all serious or common in New Jersey at this time, but there is some of it.

Professor Blake states also that, following a minimum temperature of -16° F. at New Brunswick on February 9, it was found that, while not commercially serious, some injury had occurred to apples. This injury was in two forms: (1) to the floral parts of the fruit buds which means the death or severe injury to the bud, (2) to the center of the spur wood, just below the bud. The extent of the injury varied with the variety.

In discussing winter injury to grape in New Jersey, J. H. Clark states that there did not appear to be serious injury to the wood of a number of varieties. The buds of such varieties as Agawan, Ellen Scott, Duchess, Clinton, Vergennes, and Campbell Early were severely injured. A number of other varieties including many of these commonly grown showed only slight bud injury. (Wm. H. Martin, Apr. 18).

PENNSYLVANIA: From my observations and what I hear from the other specialists working in the orchard, I am convinced of the following: Hale and Elberta peaches have practically all of their blossom buds killed. In a few cases considerable leaf bud and even twig injury has occurred. Since these two varieties are our main crop in Pennsylvania, and since other varieties have also suffered quite severely, we are expecting almost no peach crop.

Apples: In many cases buds show some signs of injury. I have seen Grimes in southeastern Pennsylvania on which most of the blossom buds have been killed. Many other varieties show some browning in the blossoms; however, it is a little early to say just what the loss will be to the apple crop in this State. (R. S. Kirby, Mar. 26).

KENTUCKY: With more information available we find it proper to correct our statement about damage done to peach buds by the very low temperature the last of February.

From all information obtained it seems that the Paducah region is still in a good way for a crop. Some orchards in this region came through with fifty per cent of live buds. This means that unless further damage occurs, such trees should bear full crops.

One orchard in Henderson County, because of its unusual location, also has enough live buds to set from a third to a half crop. It is located in the overflow river bottoms just across the Ohio River from Evansville, Indiana.

From all indications there will be a very light crop of peaches produced throughout the entire Ohio River Valley. (Ben E. Miles).

Several collaborators have indicated that they will report regarding winter injury when they have concluded surveys now in progress.

DEVELOPMENT OF APPLE SCAB (VENTURIA INAEQUALIS)

MASSACHUSETTS: The last three years, scab spores matured earlier than usual. This spring, scab spores are considerably later in reaching maturity than in the average year. In the more advanced orchards, with McIntosh now in full or late delayed dormant buds, scab spores are so scarce and so late that it hardly seems possible for them to be dangerous by the time buds reach pre-pink. This situation is unusual, to say the least. Indications are, therefore, that a pre-pink spray will not be needed generally for preventing scab. Only one leaf examined up to April 21, out of hundreds, showed colored spores. I believe, from the appearance of some immature perithecia, that they have undergone unusual winter mortality. Majority of perithecia are just now (April 24) showing ascus elongation with few or no spores differentiated. (C. C. Boyd).

NEW YORK: (From State College of Agriculture Weekly News Letter, April 9 and April 16).

Development of the apple scab fungus is much retarded in comparison with the past three years in the McIntosh block at Ithaca. On March 26, less than 1 per cent of the perithecia contained well developed asci and no spores were found. On April 3, nearly half the perithecia contained well developed asci but in less than 1 per cent of the perithecia ascospores were formed and beginning to color in one or two asci.

On April 9, over half of the ascospores were colored in 1 per cent of the perithecia and less than half the spores colored in 17 per cent of the perithecia. Twenty-six per cent of the perithecia were undifferentiated. The 1 per cent of the perithecia on April 9, with over half of the ascospores colored may be compared with over 80 per cent on April 10, 1933. (W. D. Mills, Apr. 9).

Samples of McIntosh leaves gathered April 16, show a very rapid development of the scab fungus since April 9. Time did not permit examination of sufficient leaves for an accurate count but apparently the majority of the ascospores are colored in about half the perithecia. No evidence of ascospore discharge in this morning's rain was obtained. (W. D. Mills, Apr. 16).

MICHIGAN: With unusually continued cold weather through February and March, the season is somewhat later in Michigan this year than it was last year. Examinations of dead apple leaves on April 2, at East Lansing, showed that a considerable number of perithecia of the various ascomycetes composing the flora of dead apple leaves and including Venturia inaequalis now have well formed asci. Some of these, thought to be Pleospora, are beginning to form spores. (Donald Cation, Apr. 4).

Favorable moisture and temperature conditions have forced the maturity of apple scab ascospores until they are but a few days behind in comparison to their condition last year at this time. Perithecia are plentiful and a majority of those examined show well developed asci and colorless ascospores. The most favorably situated leaves frequently show almost mature perithecia with many colored ascospores. On April 10, a few apple buds in southwestern Michigan were beginning to break into the silver tip stage. It is expected that scab spores will be ready to discharge during the early delayed dormant period. There was little difference in the maturity of apple scab spores examined at Berrien Springs, Bangor, and East Lansing on April 9 and 10. (Donald Cation, Apr. 12).

KENTUCKY: Growth of apples commenced April 1 following a dry cold period of two weeks or more. Perithecia were fairly numerous but very immature. April 7, 1.23 inches rain at Lexington. April 9, a few mature ascospores. April 11, after .23 inches rain no ascospores found after extended search. Evidently all ripe ones discharged during rain. At Farmers, Kentucky, April 7, no mature spores. Leaves kept damp for 72 hours developed abundant mature spores in that time. April 7, heavy rain. April 11, abundant mature spores. At Paducah a few mature spores were present April 12, following light rains on the fifth, seventh, and eighth.

At Louisville mature spores were not present in full pink stage evidently because of lack of rain up to that time. (W. D. Valleau, Apr. 16).

CROP FAILURE DUE TO DISEASE

KENTUCKY: We seem to be witnessing a case of crop failure due to disease. The Latham raspberry was introduced into the State 4 or 5 years ago. It has been successful in a few instances, but extensive damage has resulted from winter killing. This spring it is not unusual to see plantings in which 90 per cent of the canes are dead. Winter injury appears to result directly from defoliation due to Septoria leaf spot. Rows sprayed with Bordeaux several times last summer now have about 70 per cent of the canes alive, sufficient for a crop. Unless spraying is practiced rather extensively failures will be so common as to discourage the growing of this desirable variety.

The Chief variety is much more susceptible to winter injury than Latham and the past two years has been a complete failure. (W. D. Valleau, Apr. 16).

MARKET PATHOLOGY NOTES FROM CHICAGO

CARROTS: One of the most interesting diseases that has come to my attention recently is a Corticium rot on New York carrots. The samples received were from the State Inspector, Mr. Duncan, at Rochester. He said that this stock had been placed in cold storage immediately after harvesting. The roots which he sent here for diagnosis were severely spotted by small slightly depressed areas which showed a slight amount of superficial fungous growth in the center. Macroscopic examination would lead one to believe that this was just another case of Fusarium rot, but when some of the mycelium was placed under a microscope, it was discovered that the hyphae showed very definite clamps and in many of the spots basidiospores were present. The common crown rot induced by Rhizoctonia was noted in this stock and there were some sclerotia observed on a few of the roots. However, the decay showing the presence of the Corticium stage was by far of the greatest importance. Apparently the infection took place through the secondary roots and worked up through these into the tap root. The storage conditions evidently were very favorable for the slow development of this fungus and for the production of spores.

COCONUTS: During one of the cold periods in February we had our first experience with frozen coconuts. On inspection of a few cars it was found that a high percentage of the nuts had the milk within them frozen solid. On cracking the coconuts while still frozen, it was found that the flesh appeared in normal condition and had good flavor. The question arose as to the palatability of these nuts after they had thawed and been placed on the retail market, so in order to determine this we held some of the frozen nuts for a week at room temperature. On cracking these specimens we found that the milk had a tendency to be slightly stringy, but not particularly off-color. The flesh was not discolored but it was distinctly more dry and poorer in flavor than the normal coconuts.

APPLES: New York apples arriving on the market have been showing considerable development of scab (Venturia inaequalis) and following the scab, pink mold rot (Cephalothecium roseum) has been very much in evidence.

TOMATOES: The most important decay in Florida tomatoes this season has been due to Phoma. Numerous inspections have shown very high percentages of Phoma rot and in some instances it was necessary to dump the greater part of some loads.

PEAS: A rather unusual development of pod spot has shown up in peas from the Santa Maria district in California this spring. A sample of vines sent in by the inspector in charge of that district showed the most serious development of Ascochyta blight that I have ever seen. It is said that this disease has not previously been of much consequence in that area. (G. B. Ramsey, Apr. 9).

DISEASES NOTED AT THE NORTHWEST FLORISTS' CONVENTION, SEATTLE, April 16, 1934.

Leon K. Jones

The Northwest Florists' Convention was held in Seattle, April 15, 16, and 17. The Growers'-Section meeting devoted about two and one-half hours to a clinic on "Diseased Plants." Specimens were collected from various greenhouses by members of the State Department of Agriculture, Division of Horticultural Inspection. Individual growers also brought their best specimens. The following diseases were noted, and the nature of the disease as well as its control was discussed in the meeting:

1. AZALEA
   Leaf curl - Exobasidium japonicum Shir. (from Mount Vernon)

2. CALCEOLARIA
   Stem rot - Sclerotinia sclerotiorum (Lib.). Mass.

3. CARNATION
   Rust - Uromyces caryophyllinus (Schr.) Wint.
   Fusarium wilt - Fusarium sp.
   Fairy ring - Heterosporium echinulatum (Berk.) Cke. (from 2 greenhouses).

4. CHRYSANTHEMUM
   Leaf nematode - Aphelenchus ritzema-bosi Schwartz

5. CINERARIA
   Stem rot - Sclerotinia sclerotiorum (Lib.) Mass.

6. DELPHINIUM
   Witches' broom - Virus
   Black spot - Bacterium delphinii E.F.S.

7. GARDENIA
   Leaf and bud drop - Physiological

8. GERANIUM
   Leaf spot mottle - Virus (from 3 greenhouses. Possibly the same as Krauselkrankheit of Germany).

9. GLOXINIA
   Stem rot - Sclerotinia sclerotiorum (Lib.) Mass.

10. IRIS
    Mosaic - Virus
    Bulb rot - Penicillium sp.

11. SNAPDRAGON
    Rust - Puccinia antirrhini Diet. and Holw. (from 4 greenhouses)
    Stem rot - Phyllosticta antirrhini Syd.

12. TOMTAO
    Mold - Cladosporium fulvum Cke.
    Mosaic - Virus
    Spotted wilt - Virus (from 2 greenhouses)

13. TULIP
    Fire - Botrytis tulipae (Lib.) Hopk.

REMARKS CONCERNING THE INSPECTION OF NARCISSUS PLANTATIONS FOR NEMATODE INFESTATION

R. J. Hastings and J. E. Bosher
Laboratory of Plant Pathology, Saanichton, B. C., Canada.

The "spikkels" are probably the best external evidence of nematode infestation in narcissus. These pale yellow elevated areas on the foliage can nearly always be found if the bulb nematode, Anguillulina dipsaci (Kühn 1858) Gerv. & v. Ben. 1859, is present. But according to Steiner (Jr. Parasitology, Vol. 19: 255. Mar. 1933) both the "spikkels" on the foliage and the characteristic brown ring symptoms of the transversely cut bulb may sometimes be absent in stock that is infested. According to Steiner and Buhrer (Phytopathology 22: 927. Nov. 1932) the brown ring is not a specific symptom of bulb nematode infestation. It is apparent, therefore, that field inspection results should be checked by laboratory examinations.

The "spikkels" are best seen in the diffused light of a dull day and are usually more abundant close to the ground level. In the data presented herein, it is apparent that the "spikkels" continue to appear up to the time the plants have attained full growth. The first inspection of a plantation of King Alfred bulbs on March 12, revealed less than one-eighth as many infested plants as the last on April 4, probably because many of the infested areas of the leaves and scapes during the early growth period were still below ground level. On April 4, the

plants were past full bloom and had attained practically their full growth. The ideal time to inspect for nematode symptoms is, therefore, when the varieties attain full growth or a little later. However, a delay after the narcissus are in full bloom is undesirable, for usually the secondary stage of leaf scorch, caused by the fungus, Stagonospora curtisii (Berk.) Sacc., begins to appear when the plants are full grown, and the characteristic symptoms, namely, the raised reddish spots can easily be confused with nematode "spikkels", particularly when the foliage is mature and the "spikkels" have turned brown and have split.

Table 3 - The apparent increase in the number of infested King Alfred plants in a plot as revealed by inspections over a period of 23 days.

	Plants with healthy foliage and scapes	Plants with spikkeled foliage and scapes	Percentage Plants infested
March 12, 1934	422	28	6.2
March 16	400	50	11.1
March 19	384	66	14.6
March 21	322	88	19.5
March 27	300	150	33.3
April 4	218	232	51.5

LEAF VARIEGATION REAPPEARS IN THE BLAKEMORE STRAWBERRY

Last season a leaf variegation symptomatically identical with that long known on strawberries in the northeastern United States was reported on the Blakemore variety in Maryland, Virginia, North Carolina, Louisiana, Arkansas, and Oklahoma. (See P. D. R. XVII: 145-147, 165-166). The first report of the 1934 season has just been received from Arkansas through Dr. V. H. Young, Greenwood, Arkansas.

"Last fall and during the winter this light color disappeared and the plants appeared to be normal. This spring, however, the light color is appearing again on quite a few of the affected plants but I do not believe it is showing yet on all the plants that were affected last year.

"The affected plants are not producing anything near a normal crop. The healthy plants near by have set many more berries which are ripening; while the affected plants are ripening very few berries and these are of poor quality." (Ray D. Johnston, Apr. 28).

Dr. George Darrow is naturally much interested in the spread of this trouble and further reports of the distribution and severity of this leaf variegation on the Blakemore will be appreciated by him and by the Plant Disease Survey.